

FIRST THINGS FIRST

What To Do Before Investing in Home Insulation

LITTLE THINGS MEAN A LOT

There is no question that a well weatherized home is a well insulated home. But insulation is not the only thing you can do to save energy dollars. It is not even necessarily the first thing you should do. There are several measures which cost less money, but provide significant fuel savings. They are tested, no-risk common-sense measures which should be part of any serious household energy conservation program. In energy conservation, even little things mean a lot.

The energy crisis has created an enormous interest in fuel conservation. Many homeowners are now exploring ways to weatherize their houses, making them more comfortable and less expensive to heat and cool. This mushrooming interest has caused problems. New, untested products are being placed on the market to take advantage of high consumer demand for conservation. In a few cases, unscrupulous people have gone into the home weatherization business. Demand for home insulation is so high that there is a nationwide shortage of good insulating materials. And many homeowners, believing that insulation is the **first** thing they should do, have sunk major investments into insulation materials of questionable safety and efficiency. Such problems have occurred especially among homeowners who have insulated outside walls.

Despite the problems, home weatherization remains an important and advantageous thing to do. Done carefully and wisely, it's one of the best investments a homeowner can make. The money saved each month on heating and cooling bills is like an extra paycheck, with one notable exception: you don't have to pay taxes on the money you "earn" by lowering your home's energy consumption. In addition, a weatherized home is a more valuable and more saleable home. Buyers are more concerned than ever about energy efficiency, and many homeowners find that the money they've invested in weatherization is returned in higher sale prices when they market their homes.

FIRST THINGS FIRST

This pamphlet outlines five steps you can take to weatherize your home. The steps are arranged for the typical North Dakota home in order of greatest savings for lower cost. The steps are:

- Controlling Indoor Temperatures
- Controlling Air Leaks
- Maintaining Heating Systems
- Reducing Heat Loss through Windows
- Adding Insulation

To carry out your home weatherization program, start with step number one and work your way down the list as far as your budget will allow.

1. Control Indoor Temperatures

Thermostat adjustment is one of the ways you can operate your household so that it wastes as little fuel as possible. Much energy can be saved by heating or cooling only those portions of the home in which heating and cooling are really necessary. Turn off heat or air-conditioning in unused rooms.



In those rooms which are in use, make sure that curtains, furniture and other objects do not block radiators or registers. Then, adjust your thermostat so that you are heating or cooling only as much as is really necessary.

For each degree you reduce your indoor temperatures during the heating season, you will save about 3 per cent on fuel. For example, turning down your thermostat from 72 degrees to 68 degrees will save about 12 percent of your home's heating energy. Turn your thermostats down even further at night and when you are away from home. Contrary to popular opinion, warming your house back up **does not** use more fuel than you have saved. During the summer, set your air conditioner at a comfortable 78 degrees.

When cutting off heat or reducing indoor temperatures, be careful not to freeze water pipes. If necessary, use heat tapes and insulation to protect exposed pipes. For pipes within outside walls, keep indoor temperatures high enough to prevent freezing.

Thermostat adjustments cost nothing, but they can save a significant amount of fuel. If you wish, you can invest in a clock thermostat which will adjust indoor temperatures automatically.

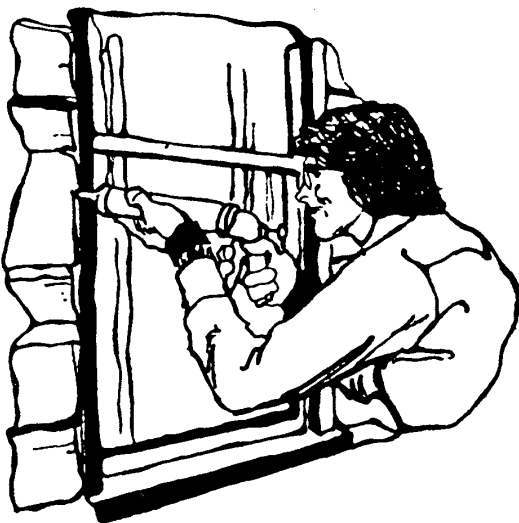


2. Control Air Leaks

When trying to live in a cooler house, many people notice uncomfortable drafts. The solution is to eliminate the drafts, rather than turn the heat back up. For very little cost and a small investment of labor, you can plug up most cracks which let cold air into your home. These air leaks are usually the greatest single cause of heat loss in a home.

Air leaks around doors and windows, through openings into the attic, above the foundation wall and around the chimney can be stopped by caulking and weatherstripping.

Another major source of cold air is frequent door openings. No matter how much you weatherize your home, you can waste substantial amounts of money by opening doors often. Try to use a door protected by an enclosed area. Entering your home through the garage or through an enclosed porch, or using a door that opens into a vestibule can save a great deal of heat — again at no cost. This is especially important for families with children or pets. If you wish, seal off unused doors for the winter, but make sure they can be opened easily in case of emergency.



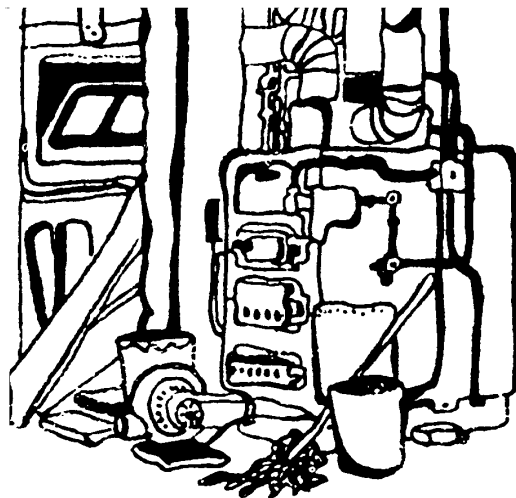
3. Maintain Heating Systems

Your furnace will work harder and use more fuel if it is not properly maintained. Heating systems should be given routine maintenance every year to keep them running efficiently. Ask your service representative to show you how to change air filters and install new filters frequently.

Also ask your service representative to help you check your entire system carefully for things that need additional work. Seal leaks in ductwork and insulate all ducts exposed to the cold in attics, crawl spaces or garages. Up to six inches of insulation is needed for hot air ducts exposed to outside temperatures. If you have hot water or steam heat, make sure all pipes are well insulated. The heat escaping from ducts or pipes often helps heat basements and crawl spaces. Make sure insulating the ducts will not cause plumbing to freeze.

If you have a very old heating system, it may pay to replace it. This will require careful consideration, since it will mean a major investment. Talk to your building inspector, local heating contractor or your local utility before choosing a new system. Make sure the system you choose is safe and suitable for your needs.

Be extra cautious if you plan to modify your existing heating system with devices now on the market to help save energy. Consult your utility or a reputable local heating contractor to make sure such devices are safe.



4. Reducing Heat Loss Through Windows

Windows are, to a degree, uninsulated holes in your house. By adding storm windows, you can reduce by half the heat lost through single-pane windows. Adding a third layer of glass or plastic will reduce heat loss by an additional one-third. Most hardware stores or lumber yards now offer materials which will allow you to add additional layers of glass or plastic. The type of product you use will determine whether you should add the new layer on the outside or inside of your windows. Added layers which cover the cracks around movable parts of your windows will help stop air leakage.

Even with three layers of glass or plastic, however, the heat loss through windows is at least 10 times that through a well insulated ceiling. You might consider movable insulation, such as heavy, tight-fitting drapes or insulated shutters. Make sure that whatever you do does not cause a fire hazard, and that windows can still be opened quickly if they may be needed for emergency escapes.



5. Add Insulation (carefully)

If there is one piece of general advice governing home insulation, it is: **Be Cautious.** Insulation is the most complicated and can be the most expensive of the five steps. It is also the measure most apt to involve the hiring of contractors. Unless you choose proven materials and unless those materials are installed properly, insulation can cause serious problems.

The effectiveness of different types and thicknesses of insulation is indicated by "R-value." R-value is a measure of how well a material resists transmitting heat — in other words, how well it will keep heat from passing through the walls, ceilings and floors of your home. The higher the R-value, the more effective the insulation. When purchasing insulation, pay attention to its R-value. Two materials of the same thickness can be substantially different in how well they insulate.

In regard to your budget, insulation should be approached in the same way as home weatherization in general: by accomplishing first those steps which are easiest and least expensive.

Insulate your home in the following order:

(a) Attics or Ceilings:

These often can be insulated by the homeowner. Determine the type of insulation in your attic now and measure its thickness. Using the table above find whether the R-value of your present insulation is less than 10. If it is, it will pay to add enough new insulation to increase the R-value to 38. If you are a do-it-yourselfer, remember that adding insulation is not simple. Vapor barriers, attic ventilation and the safety and efficiency of different materials all are critical considerations. Improper installation can cause structural damage to your house and ruin the insulation wasting your investment. Before purchasing or installing your own insulation, order and read appropriate booklets recommended at the end of this brochure.

INSULATION VALUES

Material:	Approximate Inches for . . .		
	R per INCH: (average)	R19	R38
Bat/Blanket			
Mineral Fiber (rock, slag or glass)	3.3	6	11½
Cellulose	3.5	5½	11
Loose Fill			
Mineral Fiber (rock, slag or glass)	3.0	6½	13
Cellulose	3.6	5½	11
Vermiculite	2.1	9	18
Perlite	2.7	7	14
Rigid Board			
Extruded Polystyrene (Styrofoam)	5.0	4	8
Expanded Polystyrene (Beadboard)	3.6	5½	11
Urethane	6.2	3	6

(b) Top of the Foundation Wall:

An important area for insulation is the place where the upper part of your house meets the foundation wall. This section has several names, such as box sill, band joist and shelf. It is easy to find. Caulk any cracks to prevent air leakage into the house, then insulate by pressing six-inch fiberglass batts into place.

(c) Floors Over Unheated Areas:

Insulate the underside of floors over unheated areas such as crawl spaces, garages or basements. These spaces should be insulated to a minimum of R22. When using insulation with a vapor backing material (brown paper or foil), make sure the vapor barrier is facing up, toward the heated room.

(d) Exposed Foundation Walls:

Insulate the exposed portions of foundation walls, such as those in a basement. Rigid board insulation (styrofoam, beadboard and urethane foam) can be added outside the wall with the portion above ground protected by asbestos cement board or some similar material. (Sunlight causes the insulation to deteriorate.) A more expensive alternative is to build a frame wall on the inside of the foundation, insulating between the studs. Or you can glue rigid board insulation to the foundation wall. For fire safety, make sure it is covered with dry wall.

(e) Uninsulated Frame Walls:

Frame walls containing no insulation are the last area of the home to insulate. This is because they are the most difficult and, therefore, the most expensive. It is worthwhile to insulate them if other, more cost-effective measures have been done first, and if you use proven insulation products that are installed properly. Once again, be careful: You must provide a proper vapor barrier.

Normally, **do not attempt to insulate walls which already contain some insulation.** If you have an insulated frame wall with special problems, consult a professional.



WINTERIZATION AND MOISTURE

When you winterize to reduce heat loss from your home, you also will reduce the amount of moisture lost from the home. This will provide greater comfort, but it can lead to problems of excessive moisture. Here are some precautions you should take:

- If you have a power humidifier on your furnace, be sure its control works and is never set above 30% humidity. Adjust the control daily according to outside temperature.
- Limit your use of portable humidifiers.
- If you vent your electric clothes drier inside the house, watch for excessive condensation. (Never vent a gas clothes dryer inside the house.)



OTHER WAYS TO SAVE

If you are considering **remodelling** your home, there are several changes you could make to save energy. Among the possibilities: adding a double-door vestibule in the home's entrance; replacing old windows that leak cold air; installing smaller windows, or eliminating windows on the north side of your home (make sure to check with your building inspector

and to retain an adequate means of emergency escape in each room); eliminating pipes and ducts in outside walls and insulating the spaces they took up; replacing furnace or water heater with high energy-efficiency models; and insulating outside walls when re-siding. Adding "insulated siding" is not enough. Consider insulating the wall when re-siding.

LET THE WEATHERIZER BEWARE

Like all home improvements, winterization takes planning and care. Among its challenges are the complicated issues of safety and efficiency, the selection of proper materials and the selection of qualified contractors for those jobs a homeowner chooses not to do alone.

Some local utilities in North Dakota now are offering home "energy audits" which advise homeowners on how to select and budget for weatherization measures. Check to see whether such assistance is available in your area.

Here are some points to consider when planning your home weatherization program:

- Remember that many home winterization measures are relatively permanent. Take the time to investigate the materials available and to make the right choices. Generally, purchase the highest quality materials you can afford. Similar but less expensive products may have to be replaced sooner and may not be as effective in reducing energy waste.
- Keep in mind that claims of fuel savings for different measures and different materials should be regarded only as "guesstimates." Actual savings will depend on variables such as the quality of your house. In insulation materials, there is often a difference too in the material's "theoretical" and "in place" insulating value. In other words, the material may have a higher insulating value in theory than it does after it has been installed and has gone through settling or shrinkage. Be sure to investigate the material's after-installation insulating value.
- Obtain several cost estimates from well established weatherization firms before choosing a contractor. Ask contractors for the names of several customers for whom they've done work and check to make sure the past customers are satisfied. Make sure all contracts, guarantees and sales promises are **in writing**.
- Be wary of new energy saving products and devices. Some may be quite good but few have been tested by reputable laboratories. The best advice is to be skeptical of new products which have not been approved by reputable underwriters.
- Many homeowners are thinking about supplementing their conventional heating systems with solar systems or woodburning equipment. You should **not** consider a solar system until you have accomplished the weatherization measures outlined in this brochure. Your house should be energy-efficient before trying to install a solar heating system. There are many woodburning stoves now on the market, and they vary a great deal in efficiency. Unless you purchase an efficient stove and burn only properly prepared wood, **you can actually spend more money on wood heat than conventional heat**. Among the features of more efficient woodstoves are airtight construction, designs which provide for secondary combustion and which allow easy loading of sufficient quantities of wood so that you will not have to fuel the fire frequently.

Carefully follow manufacturers instructions and local codes to ensure proper, safe installation and use. **Even at their best, fireplaces are only about 10 per cent efficient.** They are not a good way to heat a house, and actually draw more heat from your home than they add when outdoor temperatures are 40 degrees Fahrenheit or lower. When a fireplace is not in use, make sure the damper is closed tightly to limit the loss of warm air up the chimney.

If you have more specific questions regarding energy conservation in your home, review the materials listed in the bibliography at the end of this brochure. The materials may be ordered at no cost from the Office of Intergovernmental Assistance. You can also contact your local utility or Community Action Agency to request materials and/or information. If you are concerned about possible fraudulent or deceptive selling practices, contact the Consumer Fraud and Anti-Trust Division of the Attorney General's Office.

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State Capitol - 14th Floor
Bismarck, ND 58505
(701) 328-2094

Consumer Fraud and Anti-Trust Division
Attorney General Office
State Capitol
Bismarck, ND 58505
(701) 328-3404 or 1-800-472-2600

Local Community Action Agency:

Minot (701) 839-7221 or (800) 472-2652
Devils Lake (701) 662-5386
Grand Forks (701) 746-5431
Fargo (701) 232-2452
Jamestown (701) 252-1821 or (800) 532-8671
Bismarck (701) 258-2240
Dickinson (701) 227-0131
Williston (701) 572-8191

FOR FURTHER INFORMATION

The Office of Intergovernmental Assistance has the following free publications available:

Moisture and Home Energy Conservation: How to Detect, Solve, and Avoid Related Problems

Introducing Supplemental Combustion Air To Gas-Fired Home Appliances

Heat Recovery Ventilation For Housing: Air-To-Air Heat Exchangers

Window Insulation: How To Sort Through The Options

Tips For Energy Savers

Mobile Home Energy Savings: Keep Comfort Up and Costs Down

Insulating The Existing Home: Properties of Common Insulation Materials

Insulating The Existing Home: Preparing To Insulate

Insulating The Existing Home: Applying Insulation

Using The Earth To Heat and Cool Homes

Geothermal Groundwater Heat Pump: An Efficient Way To Heat and Cool Your Home

Heating With Wood

Drying Wood With The Sun: How To Build A Solar-Heated Firewood Dryer

Solar Greenhouses and Sunspaces: Lessons Learned

The Construction Of A Thermosiphoning Air Panel: How To Build Your Own Solar Collector

Homemade Electricity: An Introduction To Small-Scale Wind, Hydro, and Photovoltaic Systems

Reproduced in the interest of increasing energy efficiency and renewable energy awareness.

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